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ABSTRACT

This report provides an overview of occupational education as offered by the public schools and community colleges of Massachusetts. It is intended to serve as a reference work for the Governor, legislators, and educators. The five sections of the report describe the occupational education delivery system, the governance of occupational education in Massachusetts, occupational education teachers, the equipment and curriculum used in the programs, and the cost-effectiveness of occupational education. The report stresses the need for and cost-effectiveness of occupational education for the future of Massachusetts. (KC)

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TABLE OF CONTENTS

		Page
	INTRODUCTION	
I.	THE OCCUPATIONAL EDUCATION DELIVERY SYSTEM.	1
II.	THE GOVERNANCE OF OCCUPATIONAL EDUCATION IN MASSACHUSETTS	6
III.	TEACHERS.	10
IV.	EQUIPMENT AND CURRICULUM.	12
V.	COST-EFFECTIVENESS OF OCCUPATIONAL EDUCATION. . . .	14
	TABLES	
	APPENDICES	

PREFACE

This is a report of the Massachusetts Advisory Council on Vocational-Technical Education. The purpose of the report is to give the reader an overview of occupational education as offered by the public schools and community colleges of Massachusetts. The report is intended to be a reference work for those who need basic information about occupational education.

The intended audience for this document is the Governor, the Joint Education Committee of the State Legislature, the State Board of Education and the occupational education professional community. A brief summary of the report, written in simple language, free of jargon, is available for the general public.

This report was jointly funded by the Massachusetts Advisory Council on Vocational-Technical Education and the Massachusetts State Board of Education. The views expressed herein are those of the Advisory Council, however, and do not necessarily represent those of the Board of Education.

INTRODUCTION

Occupational/vocational education in Massachusetts and the United States has its roots in the institution of apprenticeship and in the Manual Training Movement of the late nineteenth century. During the first two decades of the twentieth century, demands from management and labor for skilled manpower, and educators' concern over the excessive dropout rate associated with the traditional classical curriculum, resulted in widespread acceptance of occupational education as worthy of public support.

With its rich educational heritage, Massachusetts was an early leader in the fight to make occupational education legitimate, and by 1910 had developed a comprehensive system for occupational education in the public schools that served as a model for other states. The Commonwealth's educators played a key role in the campaign for federal aid to occupational education, culminating with passage of the Smith-Hughes Act of 1917 -- a landmark piece of federal legislation that remains in effect today.

Despite recent cutbacks in local budgets, there still is widespread support among the general public for occupational education. For example, a recent statewide survey commissioned by the Boston Globe indicates that, faced with a choice of better schools or lower taxes, an overwhelming majority of Massachusetts citizens favors improving the schools.(1) The most recent nationwide Gallup Poll of the public's attitude toward the public schools evidences strong support for occupational education as a required subject for public high school students.(2) The National Center for Research in Vocational Education's latest findings on the effectiveness of occupational education programs shows that the general public, employers and legislators alike view occupational education favorably.(3) A recent survey of Massachusetts employers also shows a high degree of satisfaction with the skills of secondary occupational education graduates.(4)

Clearly, most people continue to believe that formal, employment-related education programs offer economic benefits both to the individual, in the form of a better job and higher wage, and to society, in the form of improved productivity. This belief is reflected in enrollments and expenditures. In the Commonwealth of Massachusetts, approximately 350,000 individuals are enrolled in some form of publicly supported occupational education. Total expenditures for occupational education are $230 million, of which $215 million are state and local funds, and $15 million are federal funds.

Today, however, occupational education is faced with economic, technological and demographic changes requiring new priorities and new programs. Even those who express general satisfaction with the results of occupational education say that it should be more closely linked to business, that it must give greater emphasis to basic academic skills, and that programs must keep up to date with changing times.

At this point, two caveats must be introduced. The first concerns terminology -- specifically, the difference between occupational education and vocational education. The term "occupational education" is a general concept encompassing a wide range of employment-related training or education. It includes, for example, career guidance, exploratory programs and programs in consumer and homemaking education. On the other hand, the term "vocational education" usually is reserved for intensive skills training programs designed to prepare students for entry level jobs such as plumbing, auto mechanics or electronics technology. Practitioners often use the terms interchangeably but the general public refers to everything as "vocational education." This report uses the term "occupational education" in its broadest sense; i.e., all programs conducted by secondary and postsecondary educational agencies to prepare youth and adults for work.

The distinction is of more than academic interest because programs which are eligible for special state financial assistance are defined by state law as "education of which the primary purpose is to fit pupils for profitable employment";(5) i.e., vocational education. Such programs are subject to state approval based on criteria established by state law and regulations. Programs eligible for federal aid, however, fall under the broader category of "occupational education" as defined under much less restrictive federal statutes. Thus, the State apportions some of the federal funds it receives to programs which do not meet state criteria and which are not eligible for special state aid when the federal funding runs out. The State classifies such programs as "occupational education."

A second caveat concerns data. Although there has been dramatic improvement in the State's data collection and processing capacity over the last few years, the State does not collect data on private, post-secondary programs nor on employer-based programs, so that no completely accurate count exists of total enrollments in all programs that conceivably might be called "occupational." Some reasonable estimates can be made, however, and valid, reliable data do exist for the publicly supported programs that account for the bulk of enrollments.

A significant difference in enrollment data appears, depending on whether "occupational" education or "vocational" education is the denoting term. For example, counting only "vocational education" enrollments as defined by state law (Chapter 74), in 1982-83 there were 46,776 students enrolled at the secondary level in Massachusetts schools.(6) Using the less stringent federal definition of "occupational education," the total is 203,748.(7)

I. THE OCCUPATIONAL EDUCATION DELIVERY SYSTEM

This report attempts to describe the occupational education delivery system in Massachusetts. In addition, the report says something about the relative cost of occupational education.

The phrase "attempts to describe" is used deliberately. Occupational education in Massachusetts is provided by several different kinds of institutions, in a variety of settings, to students with diverse abilities and goals. In fact, there is so much variety that making any generalization at all about the occupational education "delivery system" is difficult.

Providers of Occupational Education

In Massachusetts, the following major institutions offer occupational education:

- comprehensive high schools, both local and regional
- vocational high schools, both local and regional
- community colleges
- proprietary schools
- apprenticeship programs
- federally funded programs under the Job Training Partnership Act
- employer-based programs

Occupational education is a key part of the Commonwealth's education system. It is estimated that about 550 different institutions in Massachusetts offer programs in more than 100 occupational fields that require less than a four year college degree, ranging from electronic technician to nurse's aide. At the secondary level, public and private comprehensive and vocational high schools represent the bulk of these providers. At the postsecondary level (i.e., beyond grade 12), occupational education is offered by community and junior colleges, regional vocational high schools, public and private noncollegiate postsecondary schools, correspondence schools, correctional institutions and by various manpower development and training institutions too numerous to list.

While all of the above are part of the delivery system, this report is concerned, for the most part, with publicly supported programs. About 40,000 students are estimated to be enrolled in postsecondary proprietary schools, independent nonprofit schools, correspondence courses, and parochial schools. In addition, there may be as many as 10,000 students enrolled in job training programs funded by the federal Department of Labor, and in apprenticeship programs. The data for such programs are unreliable, however, and in any event a description of them would increase substantially the length of this report.

The core of occupational education in Massachusetts is and always has been at the secondary level. Of the 550 provider institutions offering occupational education programs, approximately one half are at the secondary level. The largest single type of provider is the comprehensive high school, with 201 schools.

Programs and Enrollments

As noted earlier, although Massachusetts State law (M.G.L., Chapter 74) defines vocational education broadly as "education of which the primary purpose is to fit pupils for profitable employment," it also restricts the categories of vocational education eligible for special state financial aid (see Section V of this report) to the following: distributive occupations, industrial, agricultural, household arts education, practical arts classes and practical nurse training.

Federal financial assistance is provided under the Vocational Education Act, Public Law 94-482. The federal definition of what kinds of programs are eligible for assistance is less restrictive than is the State's. Hence, in any description of programs, a distinction must be made between Chapter 74 (State and locally funded) and P.L. 94-482 (federally funded) programs.

In Massachusetts, occupational education is offered in nine broad occupational areas:

(1) Agriculture
(2) Distribution
(3) Health
(4) Occupational Home Economics
(5) Technical
(6) Trade and Industrial
(7) Office
(8) Home Economics
(9) Industrial Arts

Table 1 displays enrollment data for publicly supported institutions. Excluding industrial arts and non-occupational consumer and homemaking programs, almost 60% of all enrollments is in office occupations. The second largest enrollment, about 22% of the total, is in trade and industrial programs.

These broad occupational areas encompass an impressive array of specific instructional programs (see Table 2). Overall, the Commonwealth is providing meaningful options for those who are motivated to seek education having an occupational focus.

Using the broadest possible definition of occupational education (which would include home economics, industrial arts and business education), approximately 203,748 people in Massachusetts currently are enrolled in secondary programs. About 45% of the secondary enrollment -- 92,133 -- is enrolled in office occupation courses, mostly typing, accounting and similar courses, in comprehensive high schools. The largest part of the remainder -- 39,191 -- is enrolled in "trade and industrial" courses, a broad category which includes among its many offerings auto mechanics, carpentry, graphic arts and electronics. The third largest enrollment at the secondary level is distributive occupations (e.g., retailing and marketing), with an enrollment of 4,777.

Postsecondary education (i.e., grades 13 & 14) is offered in vocational high schools and community colleges. Although many school districts have cut back or even eliminated entirely their postsecondary programs (as a result of Proposition 2 1/2), currently 33,400 people are enrolled in such programs, 49% of them in office occupations. The second largest enrollment is in technical occupations, especially programming and electronics. The postsecondary level is also an important source of trained people for health occupations. About 5,200 students in occupational education are learning such skills as practical nursing, dental and medical laboratory assisting, and radiologic technology. It may be noted that almost 70% of the health occupations enrollment is found at the postsecondary level.

The community colleges constitute a fast-growing component of postsecondary occupational education. Whereas in 1969 Massachusetts had 12 regional community colleges enrolling 7,183 full-time day students in occupational programs, today there are 15 such institutions enrolling almost 21,000 day occupational education students and 10,000 continuing education students.

Student Characteristics

FY 1982 data show that sex and ethic characteristics of students enrolled in Chapter 74 and P.L. 94-482 programs were as follows:

Chapter 74 Programs (State and locally funded)

Of a total of 46,734 students in Grades 9-12, 31,717 (68%) were male, and 15,017 (32%) were female.

In terms of ethnic origin, the statistics were:

American Indian/Alaskan native	0.24%
Asian American/Pacific Islander	0.79%
Black, not Hispanic	5.69%
Hispanic, not Black	3.70%
White, not Hispanic	89.58%

P.L. 94-482 Programs (federally funded)

Of 121,351 students in Grades 9-12 and postsecondary programs, 61,221 (50.5%) were male, and 60,130 (49.5%) were female.

Ethnic origin:

American Indian/Alaskan native	0.46%
Asian American/Pacific Islander	0.88%
Black, not Hispanic	6.83%
Hispanic, not Black	5.02%
White, not Hispanic	84.39%
Other	2.40%

Completers

Of the 11,087 students who completed Chapter 74 vocational training programs at the secondary level in June of 1981, 64% responded to a survey on their current employment status one year later. 3,765 (53%) of the respondents reported that they were employed in a field related to their training, and another 1,177 (16.5%) reported employment in an occupational field not related to their training. 1,667 (23.5%) were pursuing additional training/education or were in military service. The balance of 460 (6.5%) were unemployed or not in the labor force.

Statistics for students who had completed postsecondary training in 1981 show that of 1,614 postsecondary completers, 1,140 (71%) were employed in a field related to their training one year after completion, and 60 (4%) were employed in a field not related to their training. 76 (5%) were continuing their education or in military service, and 55 (3%) were unemployed or not in the labor force.

Sex Data

Chapter 74 programs and P.L. 94-482 programs for 1981-82 school year.

	Grades 9-10		Grades 11-12		Total	
	M	F	M	F	M	F
Chapter 74	70.3%	29.7%	65.6%	34.4%	67.9%	32.1%
P.L. 94-482	53.1%	46.9%	48.9%	51.1%	50.7%	49.3%

Priority Populations

The goals of access to and equality in occupational education, emphasizing programs and services for people with above-average needs (notably, economically disadvantaged individuals, especially those who are members of racial/ethnic minority groups, females or handicapped) have been and will continue to be major State priorities. Policies, goals and procedures for ensuring that all students are afforded equal access to occupational education programs are set forth in great detail in the State Plan for Occupational Education in Massachusetts, Fiscal Years 1983-1987 (pp. 3-20). As part of its equity program, the Division of Occupational Education recently has developed projects to recruit priority students into vocational schools; to provide inservice training to teachers, counselors and administrators; to examine schools' admissions policies and procedures; and to develop competency-based curricula (see Table 4).

Given the constraints of Proposition 2 1/2 and inflation, local units of government will be hard pressed to find the additional revenue required to fund special programs for priority populations. Breaking down artifical barriers to employment is good social policy, and using public funds to provide basic education and entry-level skills is good economic policy. For aside from the simple question of justice, the long-term economic success of the Commonwealth depends on the degree to which its skilled work force can be expanded and upgraded to meet relentless competition, in both domestic

and international markets. And since the Massachusetts workforce will grow much less rapidly in the next two decades than in the 1960s and 1970s, while the relative proportion of racial/ethnic minorities and women in the workforce will increase, the skilled people the Commonwealth needs will have to come from a pool of people who need to be better served by the traditional employment and training system.

II. THE GOVERNANCE OF OCCUPATIONAL EDUCATION IN MASSACHUSETTS

To better understand the governance and coordination of occupational education in the Commonwealth, the reader will find it helpful to keep certain facts in mind.

First, most of the resources for occupational education are allocated to the secondary level. This means that the State Board of Education and the State Department of Education are the major policy formulators and administrators of occupational education in Massachusetts.

Second, although the State ensures that school districts adhere to state and federal laws dealing with education, and the State can withhold funds if laws are violated, local school districts are largely autonomous with respect to their own education programs and services.

Third, occupational education programs at the secondary level are provided by comprehensive high schools, independent trade schools, city trade/vocational schools, agricultural schools and regional vocational-technical high schools. At the postsecondary level, programs are provided by community colleges, the regional vocational-technical high schools, state colleges and universities, community agencies, and by the Job Training Partnership Act, in a variety of ways.

Board of Education, Department of Education, and Division of Occupational Education

In Massachusetts, the State Board of Education also is the State Board of Occupational Education. The Board is comprised of twelve members appointed by the Governor, plus the Commissioner of Education appointed by the Board, and the Chancellor of the Board of Regents, who is ex officio.

The Board's policy is implemented by the Department of Education, headed by the Commissioner of Education. Occupational education policy is implemented specifically through the Department's Division of Occupational Education, headed by an associate commissioner. The Division of Occupational Education has broad authority to establish and enforce state and federal policies and to expend state and federal funds for occupational education programs at the presecondary, secondary and postsecondary levels. Massachusetts law mandates seven specific responsibilities of the Division:

1. Formulation of policy for the administration, implementation and supervision of the State Plan for occupational education;

2. Review and evaluation of all applications for federal and state funds for occupational education;

3. Provision of research and development which would improve, promote and expand occupational education in the Commonwealth;

4. Implementation of new programs throughout the Commonwealth;

5. Dissemination of the findings of the State Advisory Council on Vocational-Technical Education concerning the evaluation of existing and prospective occupational education programs, services and activities, including teacher training, and implementation of changes necessitated by such findings;

6. Development of necessary guidelines for the coordination, promotion, and establishment of programs of occupational education for the people of the Commonwealth, and for the training and upgrading of teachers for such programs; and

7. Determination, with the advice and consent of the Board of Education and the Board of Regents (see below), of the guidelines for the disposition of all federal funds for occupational education at the secondary and postsecondary levels.

In addition, with the enactment of the federal Job Training Partnership Act (JTPA), the Division of Occupational Education, and the JTPA "Service Delivery Areas" (units of local government with populations over 200,000), jointly define and cooperate on the delivery of occupational education to participants in various job training programs.

Governor's Special Assistant for Educational Affairs

The Governor's Special Assistant for Educational Affairs is responsible for making budget and policy recommendations to the Governor concerning all levels and types of education, including occupational education. The Special Assistant seeks to increase coordination among the various segments of public education and also makes recommendations for appointments to the many councils, commissions and boards concerned with education in Massachusetts.

Secretary for Economic Affairs

The Secretary for Economic Affairs is responsible for the development of commerce and industry in the State, for the Division of Employment Security and for employment and training programs, such as the JTPA, which is administered by the Office of Training and Employment Policy (OTEP).

The Governor's office has expressed a desire for more coordination among those responsible for employment and training and those responsible for education, in order to establish a more comprehensive and effective utilization of education and manpower funds.

Job Training Partnership Act

The federal Job Training Partnership Act, which became effective in 1983, combines federal, state and local resources to provide job training to economically disadvantaged and long-term unemployed people.

The business sector has equal responsibility with government in deciding how funds will be administered and what programs will be offered. The JTPA grant includes a specific set-aside (8% of Title IIA) for coordinating job training programs with occupational education programs. The Governor is responsible for coordinating state and local job training programs with all other publicly funded programs, including occupational education.

Commission for Occupational Education

The same statute that created the Division of Occupational Education within the Department of Education created the Commission. Ten members are appointed to the Commission by the Board of Education and six by the Board of Regents. By law, the Commission is comprised of a cross-section of people involved in occupational education and is advisory to the State Board of Education through the Division of Occupational Education.

The Commission recommends to the Board of Education policies and procedures regarding the formulation, administration, implementation and supervision of the State Plan for Occupational Education. The Commission also suggests new programs, reports its evaluations of existing ones, and recommends program changes.

State Advisory Council on Vocational-Technical Education

The Advisory Council initially was mandated by the Vocational Education Amendments of 1968 (P.L. 90-576) and was established in 1969 by Executive Order #66, as amended by Executive Order #79. Currently, it functions under the Education Amendments of 1976 (Title II of Public Law 94-482) and Executive Order #138. The Council presently is comprised of 26 members appointed by the Governor, with representation according to certain categories mandated by P.L. 94-482. Members serve three-year staggered terms. The members the Governor appoints must be certified annually by the U.S. Commissioner of Education as to their qualifications in representing the interest groups specified in P.L. 94-482.

The Council was established to advise and consult with the Board of Education on the development of the State Plan; to evaluate occupational education programs, services and activities under the State Plan; and to submit an Annual Report to the U.S. Commissioner of Education. The Annual Report is submitted through the Board of Education and recommends whatever changes the Council believes are warranted, based on its evaluation. The Council must conduct at least one public meeting each year.

Board of Regents

Appointed by the Governor, the 15 member Board of Regents oversees the state's public universities and colleges. Reporting to the Board are 28 separate, nine-member trustee boards, representing each of the 10 state colleges, 15 community colleges and the University of Massachusetts, the University of Lowell and Southeastern Massachusetts University. The Board of Regents determines budget allotments, closings/expansions, curriculum, tuition and staff salaries, to name but a few examples of its broad activity.

Associations of Private or Proprietary Institutions

The three major organizations of private and/or proprietary postsecondary institutions in Massachusetts are: the Association of Independent Colleges and Universities in Massachusetts (AICUM), the Massachusetts Association of Business Schools, and the Massachusetts Association of Private Schools.

AICUM is comprised of private, nonprofit, independent colleges and universities in Massachusetts. These institutions are concerned about the growth of the public sector in Massachusetts, the duplication of educational resources and the support of the public sector at the expense of the private sector, and AICUM gives them an opportunity to express their concerns in a joint and organized fashion.

The Association of Business Schools and the Association of Private Schools both have memberships comprised of nonprofit and proprietary private career schools. The Associations thus far have functioned more as services to their members than as lobbying forces to affect policy decisions about postsecondary education in the Commonwealth.

They, like AICUM, have no formal control or authority over their members; they are voluntary membership organizations. At best, they can hope only to influence their member institutions through peer pressure.

Veterans Administration

The Veterans Administration (VA) provides funds to students enrolled in approved postsecondary institutions. It does not provide funds directly to institutions or organizations.

Certain types of data must be provided by institutions that enroll veterans in order for them to receive VA benefits. Many of the same data also are required by the Office of Private Schools for license renewal.

Occupational Education by Employers and Labor Unions

Individual employers and labor unions provide training to their employees and members through such umbrella organizations as the Associated Industries of Massachusetts and the AFL-CIO Regional Office for the New England States. Apprenticeship programs in cooperation with unions always have been popular.

The Great and General Court

The General Court of Massachusetts (the State Legislature) obviously has a significant role in public education. By the enactment or amendment of education statutes, by its taxing authority and appropriations responsibilities, and by its post-audit and monitoring powers, the Legislature can promote or influence change in the public education system. It must be recognized as a critical factor in the governance and coordination of all education, including occupational education.

III. TEACHERS

The occupational education teacher today faces new challenges and must assume a myriad of responsibilities. As the idea grows that college is not necessarily the place for everyone, and as economic and technological change accelerate, professional educators constantly must upgrade pre-service and in-service programs to keep themselves current. In addition, occupational educators now are being called upon to produce graduates with stronger academic skills and better understanding of broad technical principles.

As the expectations of occupational education have changed, the training of its teachers also has undergone change. The current standards for vocational teacher approval in Massachusetts, found in the State's Chapter 74 regulations, fall under four general headings:

(1) years of experience
(2) competency
(3) college credits
(4) professional improvement activities

Documentation of Years in Trade and Education

Tradespersons who wish to become vocational education teachers must document that they have received a high school diploma or state equivalency certificate. In addition, they must have spent a minimum, regulated amount of time practicing in their trades. Specific requirements depend on the occupational area:

> Trade and industry: requires six years of recent, full-time work experience. If a candidate has a bachelor's degree in the specific field for which approval is sought, the degree may be substituted for up to three years of trade experience. A master's degree in the specific field may be substituted for one additional year of experience in trade.
>
> All other areas: require a bachelor's degree plus three years of experience in trade. However, credits specific to each field are required and vary according to the approval area. A master's degree may be substituted for one additional year of experience in trade.

Trade Competency Testing and Licensing

Trade and industrial candidates seeking provisional approval to teach must pass the statewide, written and practical examinations in their trades. If a license is necessary to practice a certain trade, teachers in that trade also must have the necessary license.

Approved College Credits

The Division of Occupational Education determines the approved content for the mandated 18 semester hours of college credit. The state regulations do

not specify that the credits must be in teacher preparation per se, although that is the generally accepted assumption. Presently, a set of eight approved course titles and outlines meets the vocational coursework requirement for full vocational teacher approval.

In order to maintain full approval as a vocational education teacher in Massachusetts, every two years each teacher must document that he or she has completed:

- 60 hours of additional on-the-job experience, either paid or unpaid, but related to the occupational area taught; or
- 3 semester hours of additional academic credit in an educational or technical area related to the teacher's instructional area.

At the present time, Massachusetts is experiencing a shortage of qualified teachers in several occupational areas, especially the technical fields. In great part, this shortage can be attributed to starting salaries that are not even close to being competitive with those offered in the private sector. This creates a curious paradox, in that business and industry attract talented people away from teaching, while at the same time criticizing occupational education for not producing enough highly skilled graduates ready to fill vital positions.

One solution, of course, is to establish salary levels which would attract talented people to the occupational education profession. Another solution would be more cooperative programs between occupational education and the private sector, in which the private sector could contribute to the development of a skilled labor force by making its qualified employees available as instructors.

In addition to improving salaries, the State needs to improve both its recruiting efforts and its teacher training programs. For example, three of the four teacher training programs currently available are under the auspices of the continuing education departments of the provider institutions: Fitchburg State College, U. Mass/Boston, and Westfield State College. Relegating occupational teacher education programs to continuing education departments dates from early concepts of occupational education's purpose and significance. These concepts no longer are relevant, when greater emphasis is being placed on basic academic skills, computer science, and the need for all students to understand principles and concepts of the technology they will encounter in the work place. Such far-reaching and ambitious goals mandate that teacher training institutions include in their complement full-time faculty members who are committed to teaching, curriculum design, research and evaluation in the field of occupational education.

IV. EQUIPMENT AND CURRICULUM

The application of advanced technology to the work place is changing the kinds of knowledge and skills workers need. In the past, occupational education has prepared people for both entry level and advanced level jobs using tools and equipment that were comparable with those used in business and industry. However, rapid technological change, higher costs and limited budgets have made the provision of relevant instructional equipment increasingly difficult. This trend is especially disturbing in programs preparing students for computer occupations, engineering technologies, electronics-related jobs, trade and technical positions involving the adaptation, installation, operation or maintenance of automated industrial equipment, and medical and health-related occupations.

Recent surveys indicate that equipment upgrading, replacement and maintenance are falling behind need, nationwide.(8) Occupational education is finding it impossible to keep up with rapidly evolving technologies in robotics, micro-processing, word-processing, laser technology, fiber optics, computer-assisted drafting and design, computer-assisted manufacturing, and electro/mechanical technology. The slow pace of infusing new technology into occupational education programs has led some states to make equipment their number one priority. They realize that lack of instructionally relevant equipment not only erodes the quality of existing programs, but also causes occupational education to decide not to implement new programs which require expensive equipment.

In Massachusetts, state aid now received by occupational education programs is insufficient to keep up with new capital equipment needs. While federal aid can be used for equipment, the amount received is quite modest compared to the need. Loans and gifts from business and industry are much appreciated, but, in general, the pieces donated are the ones being replaced by the donor. And again, the need is far greater than the supply.

Local school capital equipment budgets for the purchase of machines, tools, and instruments are easy targets for budget cutting because the immediate consequence is minimal. The long-term effect, however, is cumulative and ruinous. A laser unibody auto frame straightener costs from $9,000 - $35,000; a computer-aided drafting and design system, $15,000 - $25,000; numerical controlled machine equipment, $15,000 - $50,000. For a school district to speak of five to ten million dollars worth of equipment is not unusual. Schools try valiantly to keep their equipment repaired and up-to-date but changing economic conditions make doing so a losing struggle. New solutions must be found.

The challenge occupational educators face with respect to equipment also confronts them on the vital matter of curriculum content. Traditionally, occupational education has prided itself on preparing students for the world of work and a lifetime of steady improvement of skills, with commensurate financial reward. Some feel, however, that while occupational education has produced graduates with excellent entry level job skills, too often these graduates are deficient in the basic cognitive skills demanded by today's labor market. Numerous studies show that young people are graduating from

high school without having learned how to learn, i.e., without having mastered a body of "fundamental knowledge, concepts and skills that create an intellectual framework to which new knowledge can be added."[9]

The continuing influence on the American economy of computer and communications technologies is exerting strong pressure on occupational education to develop a more comprehensive instructional model, with greater emphasis on reading, science, math, oral and written expression, and problem solving. Central to the debate on curriculum revitalization is the idea of a "core of competencies" that are essential not only for either immediate employment or going on to college, but also for adaptability and life-long learning up to the limit of one's potential.[10] Occupational educators are designing new curricula which go beyond traditional, job-specific competencies to include higher levels of academic competencies, with greater emphasis on the general principles underlying a specific occupational field.

A good example of this more comprehensive approach to curriculum is the Principles of Technology Project (a consortium of states in which Massachusetts is participating), formed for the purposes of developing and field-testing a plan of instruction at grades eleven and twelve with broad-based concepts and principles of technology. The Commonwealth also has instituted the Massachusetts Vocational Curriculum Resource Center (MVCRC), the major function of which is to collect up-to-date occupational education curriculum resources and to disseminate these resources to teachers. The MVCRC offers technical assistance and inservice training to occupational education teachers in the use of its resources, for designing new programs or updating existing ones. In addition, a new emphasis in Massachusetts on competency-based curriculum development shows great promise for increasing joint planning between employers and occupational education, to identify up-to-date performance objectives. Such an approach has the advantage of permitting students to progress at their own, individual paces, while providing potential employers with an unambiguous record of the skills mastered by any particular student.

V. COST-EFFECTIVENESS OF OCCUPATIONAL EDUCATION

Financing of occupational education combines resources from local, state and federal levels, with the heavier contributions coming from local and state sources. In fiscal year 1984, local/state sources accounted for 94% of all funds spent on occupational education in Massachusetts.

Local funds come primarily from real estate taxes which, increasingly, are constrained by the tax limiting measure passed by Massachusetts voters in 1980 -- Proposition 2 1/2. Local funds probably account for about 65% of the cost of occupational education.

State financial assistance is distributed under Chapter 70 of the Massachusetts General Laws, which is designed both to reduce the reliance on local property taxes in financing public schools and to equalize per pupil expenditures across the Commonwealth. A system of "pupil weights" is used, under which the State recognizes that some educational programs cost more than others. For example, a full time pupil in a regular day program is assigned a weight of 1.0; a pupil in a special education program could be assigned a weight of anywhere from 2.5 to 6.0, depending on the type of special education program; occupational education receives a pupil weighting of 2.0, provided that the program is approved by the Division of Occupational Education.

Federal financial assistance for occupational education is provided by Public Law 94-482, Title II, the Education Amendments of 1976. Funds are awarded on an annual basis in conjunction with a State Plan for Occupational Education, prepared by the Division of Occupational Education and submitted to the U.S. Education Department. The federal monies are allocated to the Division in two major categories: those for state programs and those for programs of national significance. The bulk of the money is in state programs. The federal law mandates several setasides for special populations (disadvantaged, handicapped, people having limited English proficiency). For the most part, these monies are matched with an equal amount of state and local funds.

The Division allocates federal funds by formula to public school districts, public community colleges and other eligible recipients. These funds are not considered an entitlement and awards are made on the basis of submitted applications.

Priority among eligible applicants is determined by their relative financial ability to provide resources, the number or concentration of low income families, unemployment rates and the level of economic depression.

Priority among eligible programs is determined by: the need for the program (including labor market demand, with preference given to programs new to the area and those designed to meet new and emerging employment needs); the quality of program design (including development of objectives, and plans for evaluation, management and implementation); the degree of coordination for planning program development with other schools and training institutions; the extent of the program's impact on overcoming sex stereotyping in occupational education; and the degree of cost-effectiveness in the use of funds.

Priority among populations to be served is determined by federal, state and local policy, stressing access to occupational education and support services for the handicapped, disadvantaged, persons with limited English proficiency, minorities and persons in programs that are nontraditional for their sex.

In these times of fiscal austerity in the public sector, asking why occupational education often costs more than a regular high school education is a legitimate question. And given the high cost of occupational education, asking how one can assess cost-effectiveness also is legitimate. Two major factors contribute to higher costs:

1. Annual current costs and capital costs of instructional equipment, while varying greatly among programs, tend to be higher per student contact-hour. Several elements affect this factor:

   - o generally lower enrollments per course
   - o lower student-faculty ratio
   - o dual facilities -- related classroom space and laboratory and shop facilities
   - o greater maintenance requirements of equipment
   - o greater space requirements per student, due to equipment demands
   - o greater power costs related to equipment

2. The second major factor is that occupational education generally requires a greater number of student contact-hours than does general education. While credit requirements may be identical, occupational education students spend more time in shop and laboratory facilities than do general education students. The direct and indirect (support) costs associated with this factor account, in part, for added costs.

3. A third factor is the greater investment of the occupational education teacher in preparation, measured in terms of education and required experience in his/her occupational field, which translates into higher salaries to attract talented people.

As the competition for available funds intensifies, occupational education increasingly comes under pressure to justify its cost, relative to other programs. Critics ask a deceptively simple question: Since on the average, occupational education costs more per pupil than does academic or general education, shouldn't it yield greater benefits to its graduates? Traditionally, student employment success has been measured in terms of placement rates; i.e., the number of graduates who obtain employment in occupations related to their training.

Several problems are associated with the use of placement rates as the primary measure of success. First, many graduates find jobs only peripherally related to their skills-intensive training. Second, some graduates marry, or go into the military, or are unemployed for awhile before eventually ending up in jobs unrelated to their training. Most follow-up studies, however, take place within a year of graduation, so that these "delayed" placements would be missed. Third, wage rates should be as important as placement rates, even if a purely economic reward stance is

adopted. Fourth, work attitudes may be the most significant positive outcome of occupational education at the secondary level. As one study observed:

> . . .Vocational education is practiced in realistic settings in secondary school environments. Students use real equipment to create real products or services. It may be this realistic work environment, perceived as meaningful by students, that is the critical ingredient in vocational education programs. Such realistic learning environments may be essential in capturing the interest of the students. At the same time, they simulate industrial conditions in the real world in a way that facilitates easy transfer. Thus students feel at ease in the world of work, and the transition from school to work is less difficult. Such a theory should be advanced and studied, as it seems to account for the advantages in earnings of vocational graduates at the secondary level and represents a broadened basis for continued public investments in extra-cost high school vocational education.(11)

And fifth, while occupational education does have a positive long-term effect on the employment and wage experience of youth, the "education" component is at least as important as job-specific skills training. In the broadest sense, vocational education for youth has a three-fold mission: (1) to provide basic reading, writing and computation skills; (2) to provide basic educational, labor market and career information; and (3) to impart entry level job skills. Thus, youth participating in occupational education programs may continue in school, return to school, graduate to postsecondary skills training programs, go on to college, or enter the military -- all of which options are considered positive outcomes other than immediate placement in unsubsidized entry-level jobs.

Given the fact that occupational education is elective at the local level, two indices of success would be: (1) Are communities supporting it? and (2) Have enrollments (as a percentage of all enrollments) held up? The answer to both questions is "yes." For example in 1973, state, local and federal spending on occupational education in Massachusetts totaled $145,390,052, of which $132,804,114, or 91%, was state and local money. In 1983, the total spent was $252,410,058, of which $237,095,864, or 94%, was state and local money.(12)

In 1979, total secondary enrollment (grades 9-12) in Massachusetts was 355,473. The total secondary enrollment in occupational education was 209,651, which means that 59% of all students enrolled at the secondary level were taking some kind of occupational education. By 1983 -- a period of declining enrollment -- total secondary enrollment was 300,559, and occupational education enrollment was 203,748, or 67%.(13)

As an indicator of program success, one also might ask what employers think of occupational education graduates. A 1982 Massachusetts Employer Satisfaction Survey clearly indicates that employers and supervisors think the schools are effectively preparing students for employment. Of the 775 employers and supervisors throughout the Commonwealth who participated in the study, 80-90% rated former students' occupational training and/or job performance as "good" to "very good" in terms of technical knowledge, work attitude, work quality, overall training/performance, and relative preparation. The findings also indicate that supervisors tend to be almost as positive in rating the training or job preference of former students who are employed in jobs not related to their field of training (65-85% responding "good" or "very good").

Of the five aspects of occupational training and job performance examined, employers gave one -- work attitude -- a consistently high rating. This finding appears to support the notion that the vocational schools impart more than skills to their students; they provide them with an outlook and demeanor which is recognized and appreciated by employers and supervisors. The fact that supervisors were more positive in their ratings of work attitude than were the former students themselves, strengthens this interpretation.

In conclusion, it must be emphasized that occupational education is an integral part of the total educational system, and the basic academic skills it imparts are equally as important as job-specific training and orientation to work. Some of the particulars may differ, but occupational educators, no less than their academic colleagues, desire orderly classrooms, motivated students, supportive parents, up-to-date curricula, adequate financing and high professional standards. And occupational educators, no less than their academic colleagues, worry about the fact that the percentage of citizens with <u>any</u> school-age children continues to decrease, and want to make the kinds of improvements necessary to maintain public support of their schools.

Moreover, as the Massachusetts economy continues to evolve in the direction of services and high technology, it becomes increasingly obvious that anyone seeking a promising entry-level job must command basic reading, writing, computation and reasoning skills. The message from the Massachusetts business community is unambiguous: the needs of the labor market are changing and, in the future, occupational education must be more flexible and must devote increased attention to "academic" subjects.

Although there well may be some disagreement over what jobs are available and precisely what one needs to know in order to be employable, occupational educators always have been unanimous in their insistence on quality programs. This is so because occupational education graduates are evaluated according to very immediate and pragmatic criteria; e.g., Does this person show up, on time, ready to work? Does this person, in fact, possess the skills specified in his/her "certificate of competencies achieved?" Is this person familiar with the latest equipment in the field?

The reality is that quality occupational education can be expensive because it requires competent teachers current in their fields, state-of-the-art equipment, constantly revised curricula, rigorous performance standards, relatively small class size and relatively high operating costs. But the return on investment is impressive by any yardstick: better jobs and higher wages, higher productivity, improved competitive position, reduced poverty and welfare dependency, a better-educated citizenry, and a host of other returns, both economic and non-economic, to the Commonwealth.

FOOTNOTES

(1) Boston Globe, March 25, 1984, p.1

(2) "The 15th Annual Gallop Poll of the Public's Attitudes Toward the Public Schools," Phi Delta Kappan, September, 1983, p. 41.

(3) McCaslin, N. L., "Outcomes associated with participation in secondary vocational education," National Center for Research in Vocational Education, April, 1984.

(4) TDR Associates, Inc., Massachusetts Employers' Satisfaction Survey, 1983.

(5) M.G.L. Chapter 74, Section 1.

(6) Commonwealth of Massachusetts Annual Accountability Report For Vocational Education For Fiscal Year 1983, June, 1984, p. 31.

(7) Ibid., p. 28.

(8) Council of Vocational Educators, "Position Paper On Staff and Equipment Needs In Vocational-Technical Programs," May 27, 1983.

(9) National Academy of Sciences, High Schools and the Changing Workplace: The Employers' View, National Academy Press, 1984, p. 17.

(10) Ibid., p. 19.

(11) William G. Conroy, Jr., "Some Historical Effects of Vocational Education at the Secondary Level," Phi Delta Kappan, December, 1979, p. 270.

(12) Sources: Massachusetts Department of Edcuation; Facts About Education In Massachusetts: 1978-1979, p. 36; Commonwealth of Massachusetts, Annual Accountability Report For Vocational Education For Fiscal Year 1983, pp. 15, 28; Massachusetts Department of Education, Individual School Report, October 1, 1983, Table 1, p. 8; Massachusetts Advisory Council On Vocational-Technical Education Annual Report 1978, p. 32.

(13) Ibid.

TABLE 1

Fiscal Year 1983

Overall Statewide Enrollments in Occupational Programs
By Major Program Area and Level

Program	School Districts Secondary	School Districts Postsecondary/ Adult	Community Colleges Postsecondary/ Adult	Total
Agriculture	1,797	1,487	93	3,377
Distributive Education	4,777	97	1,374	6,248
Health Occupations	2,308	1,223	4,275	7,806
Consumer and Homemaking (Occ. Prep. & Not Occ. Prep.)	2,802	2,608	887	6,297
Office Occupations	92,133	1,945	16,259	110,337
Technical Occupations	3,006	2,345	7,107	12,458
Trade and Industrial	39,191	612	701	40,504
Totals	146,014	10,317	30,696	187,027
Industrial Arts				
Grades 7 and 8			57,192	
Secondary			57,734	
Total Industrial Arts				114,926
Consumer and Homemaking (Not Occupational) Grades 7 and 8				54,467
TOTAL STATEWIDE ENROLLMENTS				356,420

Source: Commonwealth of Massachusetts, Annual Accountability Report For Vocational Education For Fiscal Year 1983, p.28.

TABLE 2

INSTRUCTIONAL PROGRAM CATEGORIES

FY 1983

AGRICULTURE
Agricultural Production
Animal Science
Arboriculture
Floriculture
Forestry
Landscaping
Mechanics
Ornamental Horticulture
Other
Plant Science
Poultry Science
Supplies and Services

DISTRIBUTIVE
Apparel and Accessories
Finance and Credit
Food Services
General Merchandise
Hotel and Lodging

HEALTH
Dental Assistant
Dietary Aide
Health Aide
Medical Assistant
Medical Laboratory Technician
Nursing Assistant (Aide)
Other
Physical Therapy
Radiologic Technician

OCCUPATIONAL PREPARATION HOME ECONOMICS
Care and Guidance of Children
Clothing Management, Production and Service
Food Management, Production and Services
Institutional and Home Management and Support Service
Other Occupational Preparation-Homemaking

OFFICE
Accounting and Comptrol
Business Data Processing System
Filing, Office Machines
Materials Support, Trans., etc.
Stenography, Secretarial and Related
Typing and Related

TABLE 2 (Continued)

TECHNICAL
Business Technology
Chemical Technology
Communications Technology
Data Entry/Retrieval
Electro Mechanical Technology
Electronics Technology
Packaging Technology
Programming
Scientific Data Technology

TRADE AND INDUSTRY
Air Conditioning
Appliance Repair
Auto Mechanics
Body and Fender Repair
Carpentry
Commercial Art Occupations
Commercial Photography
Cook/Chef
Cosmetology
Custodial Services
Diesel Mechanics
Electrical Occupations
Electronics Occupations
Electricity
Graphic Arts Occupations
Heavy Equipment Operation and Maintenance
Industrial Sewing Machine Repair
Instrument Maintenance and Repair
Machine Shop
Maritime Operations
Masonry
Metal Patternmaking
Metalworking Occupations
Other
Painting and Decorating
Plastics Occupations
Printing Press Occupations
Quantity Food Occupations
Radio and T.V. Production
Radio and T.V. Repairs
Sheet Metal
Small Engine Repair
Stationary Energy Sources
Textile Production and Frabrication
Upholstering
Woodworking/Cabinetmaking

Source: Massachusetts Department of Education, Division of Occupational Education

TABLE 3

Massachusetts 1981-82 School Year
Distribution of Occupational Education Students in Comprehensive and Vocational High School
by Sex and Racial/Ethnic Group, and by Program Area

Program Area	Total	Amer. Indian/ Alaskan Native		Asian American/ Pacific Islander		Black, Not Hispanic		Hispanic		White Not Hispanic	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Agriculture	1,751	1	2	1	3	30	34	11	11	1,093	565
Distribution	5,517	2	7	10	21	153	242	49	90	1,699	3,244
Health	2,429	-	7	2	22	42	158	32	112	152	1,902
Occ. Home Economics	3,963	1	3	3	7	29	106	66	146	999	2,603
Technical	2,174	4	-	5	2	53	10	20	55	1,092	932
Trade and Industrial	41,476	79	29	164	171	1,575	590	961	296	30,777	6,834
Office	95,432	36	598	263	339	1,912	3,485	704	1,858	24,480	61,757
Home Economics	86,324	70	50	214	395	2,220	2,918	1,089	1,528	25,030	52,810
Industrial Arts	117,389	67	45	571	275	3,704	2,236	2,303	1,051	80,364	26,773
Other	4,666	4	4	41	64	284	280	88	82	2,028	1,791
TOTAL	361,121	264	745	1,275	1,299	10,002	10,059	5,323	5,229	167,714	159,211

Source: Massachusetts Division of Occupational Education

Note: Home Economics and Industrial Arts include Grades 7 & 8

TABLE 4

Fiscal Year 1983

Priority Populations Served in Chapter 74 Secondary Programs
(by Major Program Area)

USOE Code and Title	Male Enrollment				Female Enrollment				Total Enrollment	
	Total	Minority	Disadvantaged	Handicapped	Total	Minority	Disadvantaged	Handicapped	First Language Not English	Limited English Proficient
010000 Agriculture	1,037	41	142	201	567	52	81	40	23	-
040000 Distributive Education	1,420	287	385	250	2,393	345	553	239	131	56
070000 Health	133	16	22	28	1,884	236	283	166	125	188
090200 Consumer and Homemaking	283	20	54	88	1,752	267	345	249	140	31
160000 Technical	862	38	91	82	979	21	114	47	66	34
170000 Trade and Industrial	28,473	2,443	5,476	4,754	6,993	929	1,310	690	1,416	391
TOTALS	32,208	2,845	6,170	5,403	14,568	1,850	2,686	1,441	1,901	700